

XVI. *Contributions to a Knowledge of European Trichoptera. (First Part).* By ROBERT Mc LACHLAN, F.L.S., Sec. Ent. Soc.

[Read 2nd November 1868.]

UNDER the above title I propose to publish, from time to time, as occasion may require, descriptions of new genera and species of European Trichopterous insects, with notes on synonymy and local distribution, &c., combining therewith synopses of difficult genera, and elucidatory figures. To this last mentioned feature of these contributions I attach especial importance, as an outline sketch explains readily where words fail to give an intelligible idea of the distinguishing characters. A description of a new Caddis-fly without an explanatory figure loses half its value.

The present paper contains descriptions of, or notes on, species of the following genera:—

Fam. PHRYGANIDÆ.....Gen.	<i>Neuronia.</i>
LIMNEPHILIDÆ	<i>Stenophylax.</i>
	<i>Halesus.</i>
SERICOSTOMIDÆ.....	<i>Sericostoma.</i>
	<i>Oligoptectrum.</i>
LEPTOCERIDÆ.....	<i>Molannodes.</i>
	<i>Setodes.</i>
HYDROPSYCHIDÆ	<i>Arctopsyche</i> , n. g.
	<i>Dolophilus</i> , n. g.
RHYACOPHILIDÆ.....	<i>Rhyacophila.</i>

PHRYGANIDÆ.

NEURONIA STÅLII, n. sp.

In size and form similar to *N. reticulata*, but with almost the colour of *N. ruficrus*. Dull black. *Antennæ* brownish-black. *Prothorax* with a few orange-coloured hairs. *Wings* shining blackish fuscous with a violaceous tinge; veins black and strong: in the *anterior wings* the costal margin (costal and sub-costal areas) is alternately marked with dull yellowish and darker fuscous spots; a white dot at the thyridium; these wings are perhaps rather broader than in *N. reticulata*, but the difference in form is very slight. *Legs* brownish-black; the posterior tibiæ, except at the base, dull ochreous; spurs testaceous.

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Anal appendices as in *N. reticulata* (♂).

Småland, Sweden. I received two males from Prof. Stål, one of which he liberally presented to my collection.

When the wings are closed it has a most deceptive resemblance to small examples of *N. ruficornis*, only that the colour is more intense. The vestige of yellowish spotting on the costal margin of the anterior wings shows its affinity with *N. reticulata* and *clathrata*, with the former of which it agrees almost entirely, excepting in coloration, which difference is so striking as to preclude the possibility of its being a variety, the two examples being moreover precisely similar.

NEURONIA LAPPONICA, Hagen.

To this species belong the Lapland examples noticed by Zetterstedt under *N. reticulata* (Insecta Lapponica col. 1061). It differs from both *clathrata* and *reticulata* in the pale markings of the fore-wings and the ground colour of the hind-wings being whitish instead of orange-yellow: the dark median band of the hind-wings is absent. The legs are entirely pale, as in *clathrata*. In size it is larger than either species.

The app. inf. of the ♂ are produced at their upper edge into a very long curved spine, somewhat as in *ruficornis*; whereas they are blunt in *clathrata*, *reticulata*, and *Stålii*.

It has hitherto been found only in Lapland.

LIMNEPHILIDÆ.

STENOPHYLAX ALGOSUS, n. sp. (Pl. XIV. fig. 6).

Reddish-brown. *Antennæ* pale brown with yellowish annulations; basal joint fuscous. *Head* fuscous, with scattered golden hairs; *palpi* reddish-brown. *Thorax* reddish-brown; prothorax thickly clothed with golden hairs. *Anterior wings* moderately long, the apex regularly elliptical; pale gray, thinly clothed with short yellowish-gray pubescence, and regularly sprinkled with small and indistinct whitish dots (four or five of these dots are placed in each apical cell), that at the thyridium being larger and more distinct; the membrane is finely granulated throughout; *neuration* fuscous and distinct, the longitudinal veins carrying short blackish-brown hairs; the discoidal cell scarcely so long as its footstalk; all the apical cells nearly equal in width; the first oblique

at the base and as long as the third, which is two-sided at the base; second and fourth shorter, truncate at the base; fifth acute, scarcely so long as the fourth: *posterior wings* whitish sub-hyaline, slightly grayish at the tips; fringes very short, but becoming longer at the anal angle. *Legs* yellowish testaceous, with black spines. *Abdomen* blackish fuscous, with a grayish line on each side; the terminal segment slightly reddish, and carrying a few short yellow hairs on its dorsal surface.

Anal appendices. In the ♂ the dorsal margin of the last segment is slightly rounded and rolled inwards. The appendices are small and little prominent, being hidden in the cavity of the segment; reddish. *App. sup.* almost completely concealed, appearing to be ear-shaped: *app. interned.* moderately long, up-curved: *app. inf.* short, subtriangular, clothed and fringed with blackish hairs: *penis sheaths* short, broad and flattened, carrying a tuft of yellowish hairs at the tips: *penis* slender, and appearing to be sulcated beneath.

Expanse of wings, ♂, $12\frac{1}{2}$ '''.

Southern Lapland. One male, in the collection of the Stockholm Museum.

This small *Stenophylax* will not agree with the description of any of the yet uncertain species in Zetterstedt's "Insecta Lapponica;" nor does it appear to be elsewhere noticed. It belongs to the group of *hieroglyphicus* rather than to that of *stellatus*.

STENOPHYLAX ALPESTRIS, Kolenati.

From the Pyrenees (*Rev. T. A. Marshall*) I possess a pair of a small *Stenophylax*, which I cannot separate by any structural characters from specimens of *alpestris* from Carniola, Sweden, and England, in my collection; yet they have a somewhat different appearance, probably owing to local influences. The wings show scarcely a trace of pale markings, the pubescence is much less dense, and the veins are very strong and blackish fuscous, whereas they are weak and pale in the ordinary examples. I give below a description of the ♂ appendices of the typical form (from which the others do not differ in this respect), the figure given by Brauer (*Neurop. Aust.* fig. 49) being scarcely sufficiently correct.

The middle of the dorsal margin of the last abdominal segment is intensely black and scabrous, slightly rolled inwards; beneath this margin are seen the black and blunt tips of the short *app. intermed: app. sup.* small, spoon-shaped, yellow, fringed; *app. inf.* large, yellow, formed of two broad and thin plates, the inferior edge of which is excised, this edge showing a thickened geniculate portion which is continued beyond the plates in the form of a thin up-directed spine (too short and thick in Brauer's figure) which is flattened, and intensely black and shining at the tip, the thickened margin is strongly fringed internally; *penis sheaths* broad, curved upwards and inwards, appearing to be soldered together.

Genus HALEBUS.

In a paper on *Monocentra lepidoptera* of Rambur, which will be published in the Ann. Soc. Ent. de France, I have, in pointing out the affinity of that insect to the genus *Halesus*, proposed to divide the latter into three, viz. :—1. *Halesus* proper, including those species in which the ♂ has no pouch in the hind-wing; 2. *Drusus*, a name proposed by Stephens in his "Catalogue of British Insects," but afterwards erroneously reduced by him to a section of *Anabolia* ("Illustrations," Mandib. vol. vi.), including the species with a short pouch, and with hairy clothing; and 3. *Monocentra*, distinguished by scale-like clothing, and a long pouch in the hind-wing. All have 1, 3, 3 spurs in both sexes.

The species which should be referred to *Drusus* are very numerous, especially in mountainous countries, but are mostly undescribed. A few descriptions follow here, and, pending the appearance of the above-noted paper, they are referred to *Halesus* in the broad sense. *Peltotomis* of Kolenati can only be distinguished from *Drusus* by the spurless anterior tibiæ of the male.

HALEBUS (*Drusus*) MUELLERI, n. sp. (Pl. XIV. fig. 3).

Black. *Antennæ* blackish fuscous, not annulate. *Head* with strong golden-yellow hairs on the face and between the antennæ: *palpi* fuscous: *occiput* slightly swollen, with a median impressed longitudinal line; two

oval reddish warts behind, whence spring long yellow hairs; and two smaller ones, scarcely reddish and more rounded, in front, placed close together. *Prothorax* thickly clothed with long golden-yellow hairs: *meso-* and *meta-thorax* deep black, almost hairless. *Anterior wings* elongate, narrow; smoky blackish, thinly clothed with short yellow hairs, and with longer ones on the cubital veins; a large milky-white spot at the thyridium and a much smaller one at the arculus; veins strong, deep blackish fuscous; discoidal cell very long; first apical cellule much longer than the third, its base extending somewhat along the upper edge of the discoidal; the second short, straight at the base; third longer than the second, nearly rounded at the base, but with a short angle, the dot near its base (common to many *Trichoptera*) black; fourth as long as the third, obliquely truncate; fifth nearly as long as the first, somewhat acute: *posterior wings* pale smoky, somewhat iridescent; the pouch in the ♂ rather long, the hairs on the veins forming it erect, very long, grayish yellow; fringes short and grayish, long at the anal portion. *Legs* with black coxæ and femora, and grayish-ochreous tibiæ and tarsi, and black spines; coxæ deeply and broadly sulcate beneath, with a row of yellow hairs on each side of the groove. *Abdomen* dull blackish, the first segment reddish at the posterior margin above, the margins of the succeeding segments grayish.

Anal appendices of the ♂: the last abdominal segment above bears in its middle an intensely black, scabrous, spade-shaped plate, flattened and slightly depressed, extending almost to the base of the segment, its apex broadly rounded, and rather wider than the base; on each side of this plate is a deep, elongate, and ochreous cavity; the margin of the segment is regularly concave, the plate not extending beyond it; *app. inf.* long and finger-shaped, nearly cylindrical, dilated at the base, ochreous, with long black hairs at the apex; *app. intermed.* intensely black, broad, and triangular, lying so close together as to appear as one piece, their bases extending downwards, and diverging, forming carinate projections on the part whence they arise, at the beginning of each of which is a rounded reddish tubercle; *app. inf.* not longer than the *app. sup.*, ochreous, strong, sub-acute, diverging, fringed with long hairs, furnished near the base with a projecting wing-like lobe, which parts form

a deep cavity internally, in which lies the very slender and straight penis, scarcely extending beyond the lobes (♂).

Expanse of fore-wings 11'''.

Hospenthal, Switzerland (*Albert Müller*), 1 ♂.

Remarkable for the great length of the app. sup.

HALESUS (*Drusus*) TRIFIDUS, n. sp. (Pl. XIV. fig. 4).

Black. *Antennæ* black, not annulate. *Head* black; occiput with two black warts posteriorly, whence spring blackish hairs, and two similar warts anteriorly; *maxillary palpi* testaceous, the terminal joint fuscous. *Prothorax* with long reddish-yellow hairs. *Anterior wings* short, the apex rather broad; pale fuscous, thinly clothed with short golden-brown hairs; fringes short, fuscous; the pale spots at the thyridium and areculus scarcely evident; neuration dark fuscous; discoidal cell rather short (scarcely longer than its footstalk); first apical cellule long, oblique at the base, extending to one-fourth of the length of the the upper surface of the discoidal; second short, truncate; third and fifth longer than the second, sub-acute at the base; fourth as long as the second, obliquely truncate; *posterior wings* smoky, the anal fringes long and grayish fuscous; pouch of the ♂ short, its hairs bright yellow. *Legs* fuscous, the apex of the femora, the tibiæ totally, and the first joint of the tarsi, yellowish testaceous; spines black; coxæ with yellow hairs arranged in two rows. *Abdomen* dull black.

Anal appendices of the ♂: the last dorsal segment above bears an elongate intensely black plate, the apex of which is somewhat produced, and on each side of this is a short obtuse process (hence this plate appears trifid at the apex); an ochreous cavity at each side towards the apex, otherwise this segment is totally black; *app. sup.* very small, car-shaped, yellowish; *app. intermed.* lying very close together, short, the tips turned upwards and black; *app. inf.* slightly diverging, elongately triangular, sub-obtuse, blackish externally, and clothed with blackish hairs: *penis* short, cylindrical, testaceous, slightly notched at the tip. (♂).

Expanse of fore-wings 9'''.

Departement de l'Aube, France, 1 ♂.

HALESUS (*Drusus*) RECTUS, n. sp. (Pl. XIV. fig. 5).

Fuscous. *Antennæ* fuscous, narrowly annulate with yellow on the basal third. *Head* narrowly transverse, the eyes very prominent; blackish, occiput with two tubercles posteriorly, whence spring long yellow hairs, and two anteriorly, placed quite between the basal joints of the antennæ; *front* thickly clothed with yellow hairs: *maxillary palpi* testaceous. *Prothorax* densely clothed with long yellow hairs: *meso-* and *meta-thorax* fuscous, hairless. *Anterior wings* rather short and broad, the apex somewhat dilated; grayish yellow, thickly clothed with short yellow pubescence, neuration fuscous; discoidal cell short, not longer than its footstalk; first apical cellule rather longer than the third, oblique at the base; second shorter, truncate; third longer than the second, sub-acute; fourth as long as the second, and oblique; fifth longer than the third, very oblique, almost acute at the base; a whitish dot at the thyridium and at the arculus; *posterior wings* pale grayish, sub-hyaline; pouch of the ♂ short, the hairs yellow, fringes gray. *Legs* yellowish, the terminal joints of the tarsi, and the coxæ, fuscous, the latter with two rows of yellow hairs. *Abdomen* with the basal segments testaceous, the apical fuscous, each with a broad ochreous posterior margin.

Anal appendices of the ♂: the surface of the last dorsal segment is deep black, the median portion scabrous, truncate at the apex, the sides elevated into a ridge leaving a broad depressed space between; on each side of this space, near the middle, is a long golden hair; the lateral edge below the ridge shows an ochreous excision: *app. sup.* very small, the apex fuscous; *app. intermed.* short, intensely black at the tips, which appear as two rounded tubercles springing from a transverse semicircular plate at the base, which plate forms the upper cover of a deep cavity within (seen *en face*); *app. inf.* long, widely divergent, subcylindrical, obtuse, slightly curved upwards: *penis* scarcely visible (♂).

Expanse of fore-wings $9\frac{3}{4}$ '''.

Pyrenees (*Rev. T. A. Marshall*), 1 ♂.

SERICOSTOMIDÆ.

SERICOSTOMA CARINTHIACUM, n. sp. (Pl. XIV. fig. 8).

Blackish. *Antennæ* pale yellow, each joint with a broad brown apical ring; first three or four joints wholly brown. *Head* blackish, thickly clothed with blackish and golden hairs intermingled; a tuft of orange-yellow hairs on the vertex between the basal joints of the antennæ; *maxillary palpi* closely masking the face, blackish and densely clothed with blackish hairs; *labial palpi* pale brown. *Thorax* blackish; the hinder part of the mesothorax and the attachments of the anterior wings somewhat reddish. *Anterior wings* long, longly elliptical at the apex, uniformly blackish-brown with golden-brown hairs; fringes blackish-gray: *posterior wings* smoky-black with blackish-gray fringes. *Legs* all bright yellow with the femora somewhat dingy yellow; the anterior tarsi faintly annulate with brown; tibiæ and tarsi internally with short black spines. *Abdomen* blackish. *Anal appendices* reddish: *app. sup.* small, flattened pear-shaped, strongly fringed; *app. inf.* of the usual form; *app. intermed.* deeply furcate, the prongs nearly equal in length, each being very acute, and slightly curved at the tips in opposite directions; *penis* long and thin, the apex excised above; *sheaths* slender, cylindrical, thickened and incurved at the tips; *ventral triangle* small, somewhat obtuse, but with the apex produced (♂).

Expanse of wings 12'''.

Preth Valley, Upper Carinthia, 26th May (Zeller), 1 ♂.

In the colour of the antennæ and legs this insect resembles *S. Selysii*, Ed. Pictet, and *S. sp. nov.* No. 5, of Hagen in the Stettin Zeitung for 1859, p. 148 (afterwards in his "Synopsis Synonymica," named *S. timidum*); and it is no doubt allied thereto, but the form of the *app. intermed.* and of the *ventral triangle* seem sufficiently to separate it.

SERICOSTOMA FACIALE, n. sp. (Pl. XIV. fig. 7).

Blackish fuscous. *Antennæ* brown, not annulate. *Head* with tufts of blackish hairs at the angles of the occiput, and a tuft of orange-yellow hairs on the vertex between the basal joints of the antennæ; *eyes* coppery in dead

specimens; *maxillary palpi* very large and greatly dilated, standing out distant from the face, and not masking it as in other species of the genus, pale yellow, thinly clothed externally with blackish hairs; *labial palpi* shorter than in other species, the middle joint broader than the others, brown. *Prothorax* with golden-brown hairs. *Anterior wings* obtuse, obscure golden-brown, with an appearance of longitudinal yellowish streaks, whereof that in the sub-costal area is the most conspicuous; apical fringes black with a pale interruption near the anal angle: *posterior wings* smoky blackish, with blackish gray fringes. *Legs* all yellow, the femora somewhat dingy, the posterior tibiæ and tarsi brighter than the others.

Anal appendices reddish: *app. sup.* dilated and strongly fringed; *app. inf.* very strongly dilated, the superior portion above the notch very much the larger; *app. intermed.* broad, deeply furcate, the prongs curved upwards and the lower much longer and broader than the upper; *penis* shining testaceous, long, the apex notched above, pointed beneath; *sheaths* cylindrical, slightly bent, the tips thickened and curved inwards; *ventral triangle* broad and very obtuse, the margins slightly sinuate (♂).

Expanse of wings 11'''.

Switzerland, on the Aar (*Eaton*).

I have only one male of this species, which in the form of the maxillary palpi differs from all others, these organs being widely separated from the face and greatly dilated, whereas they, as a rule, lie closely pressed against the front, and mask the face; the form of the *app. intermed.* is also very different from any other species with which I am acquainted.

GENUS OLIGOPLECTRUM.

I propose this name for Rambur's genus *Dasystoma*, which name was previously applied to Curtis to a genus of *Lepidoptera*.

OLIGOPLECTRUM MOROSUM, n. sp.

Almost entirely black; the *fore-wings* clothed with thick blackish-brown pubescence; the radius without a bend; transverse veinlet uniting the ramus thyriifer and ramus discoidalis, placed almost level with that closing the

discoidal cell (or slightly nearer the apex) : *antennæ* beneath with indistinct paler annulations : the two end joints of the *maxillary palpi* equal, extending beyond the head. *Legs* brownish black, the knees pale. *Abdomen* with a whitish line on each side : the margins of the segments and the appendices slightly grayish testaceous ; *app. sup.* forming two broad triangular plates, so closely placed together as almost to appear as one piece ; *app. inf.* very small, having the appearance of being formed of two nearly equal joints (δ).

Expanse of wing 6'''.

Raibl Valley, Upper Carinthia (*Zeller*) in July ; 20 δ .

I cannot reconcile this insect with the description of any of the species described by Hagen in the *Stett. Ent. Zeit.* 1868, p. 267-273. It appears to come nearest to *mæstum*, Hagen, from Spain, of which the ♀ only is known ; but even the δ of *morosum* is larger than the ♀ of *mæstum*.

From the same locality I have a ♀ which I cannot doubt belongs to the above-described males, although its size is much greater (expands $8\frac{1}{2}$ '''), and it has the appearance of a *Silo*. The abdomen is injured. The characters the same as in δ , excepting the size.

LEPTOCERIDÆ.

MOLANNODES ZELLERI, McLachlan.

I have received examples of this apparently very local insect from Prof. Stål, taken in Småland. My other specimens have their wings expanded, but these are pinned in the natural position assumed by the insect when at rest, and in this position they especially show the affinity of the genus with *Molanna*.

SETODES MÆSTELLA, n. sp.

Fuscous. *Antennæ* very long and slender, one-third longer in the δ than in the ♀ , silvery-gray with a brownish tinge, not annulate ; basal joint long and moderately stout, clothed with grayish-brown hairs. *Head* thickly clothed with long grayish-brown hairs in tufts. *Maxillary palpi* very long, fuscous, clothed with grayish-brown pubescence ; first joint short ; second, third, and fourth, long, nearly equal, the fourth thinner ; fifth nearly as long as the third and fourth united, thin and flexible. *Thorax* slender, blackish-fuscous, hairless.

Wings fuscous, unicolorous, densely clothed with fuscous pubescence, showing a slight reddish tinge; fringes very long and dense, brown with a golden reflection in certain lights: *anterior wings* slightly acute; neuration not visible unless the hairs be removed; subcosta joining the costa beyond the middle; radius running nearly to the apex, bent beyond the middle; discoidal cell long; arrangement of the veins generally as in *S. reducta* (vide "*Trichoptera Britannica*," pl. vii. fig. 1); the three transverse veinlets in an oblique continuous line as in *S. reducta*; the longitudinal veins are fuscous, the transverse veinlets whitish hyaline. *Legs* wholly silky silvery-gray; anterior tibiæ with one short and stout spur. *Abdomen* blackish fuscous, the margins of the segments narrowly edged with whitish, and there is a whitish (probably greenish in life) stripe on each side.

Anal appendices. In the ♂ there is a short triangular black lobe in the middle of the dorsal margin of the last abdominal segment, and beneath this another long and slender lobe which is probably the upper penis cover; *app. sup.* short and broad, concave beneath, fuscous, fringed with long golden-gray hairs; *app. inf.* short, dilated at the base, the apical portion thinner, crooked, and directed upwards; in the cavity of the segment is seen a short yellow tubular piece, open at the end, enclosing the short penis (Pl. XIV. figs. without a number). In the ♀ there are two short superior lobes, longly fringed, very similar to the *app. sup.* of the ♂, and between these is a longer lobe, concave internally; the oblique apex of the last segment, seen from beneath, is greenish and shining.

Expanse of wings, ♂ and ♀, $6\frac{1}{4}$ ''.

Preth Valley, Upper Carinthia (*Zeller*), 2 ♂, 1 ♀.

This is evidently closely allied to *S. filicornis*, Pictet, (*Récherch.* p. 171, pl. xii. fig. 6), and may possibly be a form thereof. The type sent by Pictet to Curtis has lost its abdomen, and the wings are entirely denuded; the neuration appears to be the same. The colour of *filicornis* should be decidedly paler than that of *mæstella*, and Pictet says of the antennæ, "d'un fauve clair," and of the legs "rougeâtres" (with which the type agrees moderately well), whereas these parts are delicate silvery-gray in *mæstella*. Perhaps a ♀ from Zeller's original collection, without locality, may pertain to *filicornis*. *S. fusca* of Brauer is somewhat similar in its uniform dark coloration, but differs in the annulate base of the antennæ.

HYDROPSYCHIDÆ.

ARCTOPSYCHE, n. g. (Pl. XIV. fig. 1).

Antennæ not so long as the wings, stout, distinctly serrate internally, the joints all short and gradually decreasing in thickness. *Head* broad, vertex hairy and tuberculate. *Ocelli* absent. *Eyes* prominent. *Maxillary palpi* short; first joint very short; second and third longer, nearly equal, broad; fourth shorter than the third, and thinner; fifth about the length of the second and third united, very slender and multi-articulate. *Labial palpi* very small.

Thorax stout and slightly hairy; meso-thorax with a broad median longitudinal impressed space.

Wings broad, slightly pubescent and sub-hyaline, somewhat acute, fringes very short; the posterior pair shorter and slightly broader than the anterior, folded. *Anterior wings* with the costa nearly straight, and the apex longly elliptical; sub-costa and radius running nearly parallel for their whole length, united before their termination by a straight transverse veinlet, each being slightly indented at that point; an oblique (not distinct) transverse veinlet uniting the costa and sub-costa at about the middle; discoidal cell small and triangular, closed by a transverse veinlet, and united to the radius by a veinlet placed almost in a line with that closing the cell; cellula thyridii longer than the discoidal, extending much beyond it towards the base, and reaching to its middle towards the apex, closed by a straight veinlet; a very oblique veinlet unites the ramus thyriifer to the ramus discoidalis, placed between those which close the discoidal cell and cellula thyridii respectively; a veinlet unites the base of the cellula thyridii with the ramus clavalis; and there is yet another below this near the base; apical forks 1, 2, 3, 4, and 5, all present: 1 and 2 short; 3, 4, and 5, long. *Posterior wings* with the costal margin slightly excavated; apical forks 1, 2, 3, and 5 present; discoidal cell as in the anterior.

Legs long; intermediate tibiæ and tarsi very strongly dilated in the ♀; spurs 2, 4, 4, long, the pairs slightly unequal.

Abdomen short and robust, appendices of the ♂ complicated; in the ♀ the apex is obtuse, and furnished with short valves.

This genus is founded upon *Aphelocheira ladogensis* of Kolenati, and an undescribed species, *A. obesa* of Hagen. These agree with *Aphelocheira* of Stephens (*Diplectronea*, Westwood, *nec* Kolenati) in scarcely any particular, save in the internally serrate antennæ, being robust insects with the *facies* of the larger species of *Hydropsyche*; the presence of a median transverse costal veinlet and the very greatly dilated intermediate legs of the female especially separating the two genera.

The two known species both inhabit Northern Europe; the following description of the appendices of *ladogensis* is made from specimens from Lapland.

Appendices of the ♂ all yellowish or testaceous, contrasting strongly with the black abdomen, the apical margin of the last segment of which is truncate; *app. sup.* finger-shaped, rounded at the apex, and hairy; *app. inf.* very short and broad, produced internally at the base; *app. intermed.* long and shining, curved strongly downwards, parallel, the apex acute, the apical half slender, the basal half slightly thickened; from between the *app. intermed.* proceed two long *sheaths*, lying closely together, the apical portion being suddenly dilated and rounded; below these sheaths is the very large *penis*, which is deeply canaliculate above in its basal portion, the apical portion being very obliquely truncate and dilated, furnished with a strong triangular spine-like tooth in its middle above. The ♀ shows only inconspicuous valves at the apex.

DOLOPHILUS, n. g. (Pl. XIV. fig. 2).

Antennæ shorter than the wings, stout (the apical portion spirally twisted in dead specimens of the ♂), the joints nearly cylindrical; after the apical third the sutures are furnished with short and somewhat verticillate hairs; the basal joint scarcely longer than the others. *Head* densely pilose. *Ocelli* present, but concealed in the dense hairs of the vertex. *Maxillary palpi* long and pubescent; the two basal joints very short, the second being broader and stouter than the first; third joint very long and slender; fourth one-third the length of the third; fifth scarcely longer than the third, more slender and multi-articulate. *Labial palpi* small, the basal joint short, the second and third long and slender. *Eyes* prominent.

Anterior wings densely pubescent, long, elliptical at the apex; sub-costa joining the costa at about a third of the length from the apex, an oblique transverse veinlet uniting it to the costa before the middle; radius considerably longer than the costa, united to the sub-costa by a short transverse veinlet; discoidal cell long and narrow, closed; cellula thyridii internally one-third longer than the discoidal and narrower, also closed; a transverse veinlet uniting it to the discoidal, placed rather within the two, closing the above-named cells; two transverse veinlets towards the base, one placed between the ramus thyriifer and ramus clavalis, and the other, nearer the base, between the latter vein and the cubitus; apical forks 1, 2, 3, 4 and 5, all present: 1 and 2 long and narrow, reaching the discoidal cell; 3 and 4 short and broader, 4 being longer than 3; 5 very long, reaching nearly halfway to the base of the wing: fringes short.

Posterior wings slightly broader and one-fifth shorter than the anterior, folded, the fringes slightly longer; less densely pubescent and sub-hyaline; the sub-costa and radius nearly as in the anterior, united towards the apex by a transverse veinlet; discoidal cell nearly as in the anterior (a transverse veinlet uniting it to the radius is somewhat doubtful); a short transverse veinlet below it, and two others towards the base; forks 1, 2, 3 and 5 present; 1 not reaching the discoidal cell; 2 reaching that cell, broader; 3 short and triangular; 5 very long and broad.

Legs slender, the posterior pair very long; the intermediate tibiæ and tarsi not dilated in the ♀. Spurs 2, 4, 4, pairs nearly equal, those on the intermediate and posterior tibiæ very long.

Abdomen short and moderately stout; in the ♂ the app. sup. are moderately long; app. inf. very long, two-jointed and obtuse: in the ♀ the apex of the abdomen is truncate, with a short ovipositor.

The insect on which I have founded this genus has a most deceptive resemblance to a species of *Wormaldia*, and in the form of its maxillary palpi, densely hairy wings, sombre colour, and general form, it agrees almost entirely with that genus; but the neuration of the anterior wings is different, possessing as it does fork 4, which is wanting in *Wormaldia*, and thus, in this respect, it approaches *Philopotamus*. Its natural position is between these two genera.

The neuration of *Oncocerus pallescens*, Kolenati, according to the figure in the Gen. et Spec. Trichop. pt. 2. tab. v. fig. 53, should have fork 4, but Herr Brauer informs me that the type of that insect in the Vienna Museum is undoubtedly *Wormaldia occipitalis*.

DOLOPHILUS COPIOSUS, n. sp. (Pl. XIV. fig. 2).

Antennæ brown, narrowly annulate with yellowish ochreous. *Head* blackish, very densely clothed with long golden-yellow hairs; hinder portion of the occiput with two long oval reddish swellings, strongly punctured, and with two reddish tubercles in the middle (these protuberances are visible only when the hairs are denuded): *ocelli* whitish: *eyes* black: *palpi* brown. *Prothorax* densely clothed with golden hairs; and similar hairs, in tufts, at the attachments of the anterior wings; integuments of thorax blackish.

Anterior wings smoky fuscous, somewhat shining, very densely clothed with short golden pubescence; fringes golden-gray; veins fuscous: *posterior wings* smoky, subhyaline and iridescent; fringes grayish-brown.

Legs reddish-yellow, the spurs, femora, and anterior tibiæ, externally brownish.

Abdomen dull blackish, thinly clothed with pale yellowish hairs.

Anal appendices of the ♂ fuscous: the terminal margin of the last dorsal segment is truncate: *app. sup.* rather long, sub-triangular and rather acute; *app. intermed.* straight, acute, long, placed between the *app. sup.* and closely applied one against the other; *app. inf.* nearly twice the length of the *app. sup.*, closely applied one against the other, two-jointed, the joints flattened, nearly equal in length, the apical one being very obtuse, the basal one somewhat dilated at the base; no appearance of the penis or sheaths. In the ♀ the last abdominal segment is truncate, with a short protruding yellowish ovipositor (♂ ♀).

Expanse of wings 6-8'''.

Preth and Raibl Valleys, Upper Carinthia (Zeller); abundant in June. I received upwards of twenty examples from Prof. Zeller.

RHYACOPHILIDÆ.

Genus RHYACOPHILA.

Though most of the numerous species of this genus (restricting it to those in which the dorsal margin of the last segment is prolonged in the middle) resemble each other greatly in general appearance, they possess most satisfactory characters in the appendices of the ♂; the ♀ on the contrary can, in many cases, only be properly paired by observing the insects in their native haunts.

Without entering into lengthy descriptions, I propose, with the aid of figures, to notice the distinctive characters of several of the closely allied species, in amplification of Hagen's synopsis in the *Stettin Zeitung* for 1859, pp. 153, 154.

R. torrentium, Pictet, is so different from the others both in size, colour, and the formation of the lobe and appendices, as to prevent the possibility of mistake—Vide Brauer, *Neurop. Aust.* fig. 21.

R. dorsalis, Curtis, and *R. vulgaris*, Pictet. In general appearance, in the app. inf., and in the form of the dorsal lobe of the last segment these two species agree remarkably; the lobe is perhaps rather less dilated at the extremity in *vulgaris*. The principal difference, as noted by Hagen, consists in the form of the penis, which, in *dorsalis* is simple with (ordinarily, but not always) downward-directed spine-like sheaths (Pl. XIV. fig. 13), whereas in *vulgaris* it bears a blunt sub-triangular projection on its under side about the middle, with up-directed sheaths (Pl. XIV. fig. 12). The figure of the appendices of *dorsalis* in my "*Trichoptera Britannica*" is incomplete, the engraver having omitted the app. sup. The type of *vulgaris* sent to Curtis by Pictet, does not show the form of the penis very distinctly.

R. paupera, Hagen, differs from the above two species in its darker coloration, in the dorsal lobe, which is not dilated at the end and is shorter than the app. sup., and in the straight penis-sheath (Pl. XIV. fig. 14).

R. fasciata, Hagen, may be distinguished almost with certainty by the dark fasciæ on the anterior wings. The form of the dorsal lobe is very distinct from the preceding, being broad and rounded, and nearly concealing the app. sup. The second joint of the app. inf. is obliquely truncate (Pl. XIV. fig. 16). I have three ♂ from Carinthia from Zeller.

R. septentrionis, McLachlan, from Scotland, has a dorsal lobe and appendices (Pl. XIV. fig. 15) very similar to *fasciata*. In coloration and general form it is very distinct, the wings being dark, broad, and somewhat rounded, whereas they are pale, narrow, and longly elliptical in *fasciata*.

R. ferruginea, (Scopoli), Hagen. I have not seen this insect, which, according to Hagen (*in litt.*) is smaller than *septentrionis*, but with similar lobes and appendices. Scopoli's name cannot be said to apply to this species with certainty.

R. aurata, Brauer. The wings almost unicolorous golden-yellow, occasionally with faint darker markings, and a trace of the large pale dorsal spot common to most species of the genus. The dorsal lobe is long and linear, the second joint of the app. inf. deeply furcate, the branches divergent and straight, the lower being broader than the upper; the penis-sheaths are very broad at the base, afterwards produced into a long spine, curved at the tip. (Pl. XIV. fig. 11). Apparently a common species in the mountains of Central Europe.

R. venusta, (Pictet, M.S.). This species was formerly wrongly united to *R. aurata* by Hagen (Stet. Zeit. 1859, p. 154), but was afterward ("Synopsis synonymica") separated by him therefrom. It has never been described. Strongly marked individuals show a distinct dorsal pale blotch on the anterior wings, and there are semi-fasciate gray markings, especially towards the apical portion of the wing. Specimens from the Alps and Italy, in my collection, are larger than others taken by Zeller in Upper Carinthia. The dorsal lobe in the male is dilated in the middle and acuminate at the apex (one Alpine individual has this lobe of nearly uniform breadth throughout, but it is not otherwise different); the second joint of the app. inf. is furcate, the two branches curved in such a manner as to leave a nearly circular space between them, both branches being almost equal in length, but the lower is considerably the stronger; the basal piece whence arise the penis and sheaths is produced at its lower edge into a long process, obtuse and curved at the apex, and deeply canaliculate beneath; the penis is short and straight, and does not project beyond this process, the sheaths curved at the tips (Pl. XIV. fig. 9)*

* The appendices figured by Pictet at Pl. iv. fig. 29, and the pupa at Pl. xv. fig. 1c, referred to *R. vulgaris*, belong to *R. venusta*.

R. meridionalis, Ed. Pictet. This Pyrenean species, which I have not seen, much resembles *venusta* in the form of the lobe and appendices, according to the description and figures; the penis and sheaths are not mentioned. In size and colour it should be abundantly distinct.

R. intermedia, n. sp. Somewhat intermediate between *aurata* and *venusta*, but approaching nearer to the latter in general appearance; the fore-wings pale, with indistinct grayish markings and pale dorsal blotch. The dorsal lobe not dilated in the middle, nor acuminate; the second joint of the app. inf. furcate, the branches being very unequal; the upper short and thin, the lower longer and stout, scarcely divergent, and nearly straight; the penis is of a very extraordinary form, broad, and forming a keel above, the sides deflexed, produced into a spine at the apex with a small tooth above, the angles of the deflexed portion very acute; the sheaths are slender and strongly curved, the extreme apex being directed upwards; there is no produced base whence these parts arise (Pl. XIV. fig. 10). Of this very distinct species I possess two males from Zeller, one from Upper Carinthia, the other from Bruck, in Styria.

R. obliterated, McLachlan, and *R. munda*, McLachlan, apparently peculiar to Britain, can be readily recognised from the figures of the appendices in my "Trichoptera Britannica."

R. stigmatica, Kolenati, is quite unknown to me. It has furcate app. inf., but the description is too little precise to be satisfactory.

R. glareosa, McLachlan. I now give a figure of the remarkable appendices of this species (Pl. XIV. fig. 17). In my description (Stett. Zeit. 1867, p. 62) the words "appendicibus superioribus" are an obvious misprint for "appendicibus inferioribus."

The number of described European species of *Rhyacophila* is now fifteen, excluding, of course, the group of *umbrosa* (to which it has been proposed to apply Kolenati's generic term *Crunophila*;) * viz. :—*torrentium*, Pictet;

* It will probably be better to defer the generic separation of these forms *sine die*: the most important differential character is the absence in the larva of *umbrosa* of external respiratory filaments; hence our knowledge of the earlier states of both groups will require much further extension before a correct idea can be formed. The other character of the presence or absence of the dorsal lobe in the ♂ insect is rendered unsatisfactory by the existence of *R. munda*, *glareosa*, and North American forms.

dorsalis, Curtis; *vulgaris*, Pictet; *paupera*, Hagen; *obliterata*, McLachlan; *fasciata*, Hagen; *septentrionis*, McLachlan; *ferruginea*, (*) Hagen; *aurata*, Brauer; *intermedia*, McLachlan; *venusta*, Pictet, M.S.; *meridionalis*, (*) Ed. Pictet; *stigmatica*, (*) Kolenati; *munda*, McLachlan; and *glareosa*, McLachlan. The three species marked with an asterisk (*) have not been seen by me. I possess all the others. There can be no doubt that this list very inadequately represents the actual number that exist in Europe. All the species frequent swiftly-running streams and torrents, especially in mountainous districts, and when these shall have been more diligently explored, I look forward to the number being doubled; perhaps also some means of pairing the sexes may then be discovered.

Explanation of Plate XIV.

- Fig. 1. *Arctopsyche ladogensis*, neuration of wings; 1a, appendices of ♂, from above; 1b, from side; 1c, maxillary palpus.
2. *Dolophilus copiosus*, neuration of wings; 2a, appendices of ♂, from side; 2b, of ♀; 2c, maxillary palpus.
3. *Halesus* (Drusus) *Muelleri*, appendices of ♂, from above; 3a, from side (a, dorsal lobe; b, app. intermed.; c, app. sup.; d, app. inf.; e, penis).
4. *Halesus* (Drusus) *trifidus*, appendices of ♂, from above; 4a, from side.
5. *Halesus* (Drusus) *rectus*, appendices of ♂, from above; 5a, from side.
6. *Stenophylax algosus*, appendices of ♂, from above; 6a, from side.
7. *Sericostoma faciale*, appendices of ♂, from side; 7a, ventral triangle; 7b, app. intermed.; 7c, head and palpi.
8. *Sericostoma carinthiacum*, appendices of ♂, from side; 8a, ventral triangle; 8b, app. intermed.

Explanation of Plate XIV (continued).

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- Fig. 9. *Rhyacophila venusta*, apex of abdomen of ♂, from above, (the app. inf. abbreviated); 9a, app. inf., from side; 9b, penis and sheaths, from side.
10. *Rhyacophila intermedia*, apex of abdomen of ♂, from above; 10a, app. inf., from side; 10b, penis-sheath and valve, from side.
11. *Rhyacophila aurata*, apex of abdomen of ♂, from above; 11a, app. inf., from side; 11b, penis-sheath, from side.
12. *Rhyacophila vulgaris*, apex of abdomen of ♂, from above; 12a, app. inf., from side; 12b, penis and sheaths, from side.
13. *Rhyacophila dorsalis*, apex of abdomen of ♂, from above; 13a, app. inf., from side; 13b, penis and sheaths, from side.
14. *Rhyacophila paupera*, apex of abdomen of ♂, from above; 14a, app. inf., from side; 14b, penis and sheaths, from side.
15. *Rhyacophila septentrionis*, apex of abdomen of ♂, from above; 15a, app. inf., from side.
16. *Rhyacophila fasciata*, apex of abdomen of ♂, from above; 16a, app. inf., from side.
17. *Rhyacophila glareosa*, apex of abdomen of ♂, from above; 17a, from side.

Two unnumbered figures on the right hand side of the Plate near the middle, represent *Setodes mastella*, apex of abdomen of ♂, from above, and from side.
